starting movement like that of a full-grown *Sagitta*. At the anterior extremity, near the head, a pulsating organ can be distinctly seen. The ovum in all these stages contains a minute globule, which causes it to float on the surface of the water, and apparently is formed of air: I presume that it is the same globule with that seen in the egg, when first released from the ovary. The change in the floating ova from the state in which the inner sphere consists of granular matter without any trace of a young animal to the succeeding states must be rapid; for on the 27th of September all the ova were in this first state, whilst on the 29th the majority contained partially developed young ones. These floating ova were $\frac{1}{14}$th of an inch in diameter, whereas the spherical balls of granular matter which I saw expelled from their pointed oval cases were barely the $\frac{1}{50}$th of an inch in diameter; but as the eggs within the ovaries were of different sizes, according to their states of maturity, we might expect that their growth would continue after having been expelled from them. I will conclude by expressing a hope that these few observations on the propagation of this curious genus may aid more competent judges than myself in ascertaining its true affinities.

EXPLANATION OF PLATE I.

I. Intestinal tube.
o o. Ovaries.
A A. Apertures of the ovaries, and lateral fins.
T T. Tail divided into four columns of circulating granular matter, the course of which is shown by the arrows.
B. Egg just liberated from the ovary.
C. Egg in first state of change.
D. Egg in a succeeding state.

II.—*On the Marine Algæ of the vicinity of Aberdeen.* By G. Dickie, M.D., Lecturer on Botany in the University and King's College of Aberdeen.

[With a Plate.]

In the present and subsequent communications it is proposed to enumerate the marine Algæ which have been found in the vicinity of Aberdeen, and also to record such observations on their structure as may seem of most interest.

Although no great merit attaches to mere local lists, still such are not to be entirely rejected as useless, more especially when we consider their utility to those whose attention is directed to the geographical distribution of plants, a very interesting and important branch of their history.

All the species to be mentioned have been collected on the Kincardineshire coast, the southern part of the Aberdeenshire

coast being for the most part sandy; the rocky part commencing only on the north side of the estuary of the Yethan, a distance of about sixteen miles from Aberdeen.

The part of the Kincardineshire coast which has been examined is chiefly composed of granite and gneiss; it is much exposed to the action of heavy seas, and presents few sheltered coves or even calm pools of any extent, and hence probably we may account for the absence of some of the more delicate species. I regret that my records of the temperature of the sea at this place are so few and little trustworthy as to be undeserving of record.

The arrangement given in Harvey's 'Manual of the British Algæ' will be followed, although his divisions, founded on the colour of the seeds, are not strictly applicable in all cases.

Melanospermeæ.

Halidrys siliquosa, Lyngb.—Both varieties of this plant occur in considerable quantity; it is invariably found in pools, mostly at high-water mark, and is generally, or more probably always submersed.

Before proceeding to notice the species of *Fucus* occurring here, it will be requisite to direct attention to the fructification of this genus, more especially in reference to Dr. Montagne's paper in the 'Annales des Sciences Naturelles,' October 1842; in which work that profound cryptogamist has published observations on his new genus *Xiphophora*, and in connexion with it has discussed at considerable length the question, whether the *Fucaceæ* may not have two modes of propagation?

In Harvey's work the fructification of the *Fucoideæ* is defined as "consisting of spherical clusters of opake seeds, imbedded in distinct gelatinous receptacles, and finally escaping by pores;" of *Fucus* more particularly it is said, that "the receptacles contain tubercles imbedded in mucus, and discharging their seeds by conspicuous pores."

On dissecting these so-called tubercles in different stages, more especially in the earlier, it will be found that they are in reality small sacs, or inflexions of the surface of the frond, having distinct walls composed of condensed cellular tissue and each opening by a small orifice, and having a close resemblance to the perithecia of a *Sphæria*, or the so-called anthers of *Marchantia*. From the walls of the sacs originate numerous jointed filaments, in some cases simple, in others branched; the apices of many of these protrude from the orifices of the sacs, and present no great obstacle to the emission of the seeds, but prevent the entrance of any small body from without. Dr. Montagne's account of the structure of *Xiphophora* corresponds exactly with this: the sacs he calls *conceptacles*, and compares the filaments to paraphyses.

In the sacs containing *simple* filaments and at their bases, we find the seeds properly so called. These Montagne calls *basisperms*, from their position in relation to the filaments, and in order to distinguish them from the other kind of fructification. The seeds are usually imbedded in a gelatinous secretion. In some *conceptacles* we find *branched* filaments which are also jointed, and in the upper articulations of which we observe the other kind of reproductive bodies called *acrosperms* by Montagne, the microphytes of De la Pylaie, alluded to also by Meneghini, and figured by Lyngbye (Montagne, *loc. cit.*). It must not be supposed, however, that the acrosperms are invariably contained in the terminal joints of the filaments; the term is, however, sufficient to express the general difference in position of the two kinds of bodies, in relation to the filaments.

On the surface of the frond in many of the *Fucoideæ* are numerous pores, from which issue, as Greville remarks, "little tufts of filaments, the use of which has not been discovered." These I believe to be *barren conceptacles*; both the barren and fertile are in reality mere inflexions of the surface of the frond. The nature of the fructification in *Asperococcus* appears to be in favour of this opinion; in the *A. fistulosus* we have in reality the *basisperms and simple filaments* of a *Fucus* completely exposed, there being no inflexion of the surface.

Turner states that Reaumur considered the tufts of fibres arising from the pores on the frond as corresponding to the anthers of Phænogamous plants.

Fucus vesiculosus.—This species is abundant, and particularly near high-water mark and at estuaries. Dr. Montagne has only found *basisperms* in three specimens which he examined. It however possesses also *acrosperms*, the two kinds occurring on different plants.

F. ceranoides.—In this vicinity it is only found at the mouths of the Dee and Don, and also some distance up these rivers. It in some instances makes a close approach to *F. vesiculosus*, and is probably only a variety of it, produced by the action of fresh or brackish water. Like the former species also, it possesses both kinds of reproductive bodies, which are found on the same plant, but on different fronds.

F. nodosus.—This species is found in great profusion. Montagne and Pylaie have only found on it *acrosperms*, Lyngbye detected *basisperms*; Turner says that both occur in the same conceptacles. I have found both, but on different plants, and have been unable to confirm Turner's observations.

F. serratus.—Abundant. This species possesses both kinds of reproductive bodies on the same plant, but on different fronds.

F. canaliculatus is very common; for the most part an occa-

sional moistening with sea-water is all that is necessary for the development of this species, and hence it is mostly found at high-water mark. Dr. Montagne has found both kinds of fructification in the same receptacle. The basisperms in the course of their development undergo several changes: these may be easily traced in *F. serratus* and *F. canaliculatus*. In the former we first observe large cells with several nuclei in their interior; these rapidly increase in size; the parent cells now appear compound and in course of time disappear, the young cells becoming free. Figs. 1, 2, 3, 4 in Plate I. represent these stages in the species alluded to. In *F. canaliculatus* the young cells are not so numerous as in the former case.

Some time ago a few experiments were made for the purpose of ascertaining the mode of germination in the last species. A considerable quantity of its seeds were placed on slips of glass, to which they readily adhered; these were kept immersed in sea-water, which was renewed every four or five days. The experiments were conducted in a room at a moderate temperature, and in the month of December. In about three weeks the seeds were found to have undergone a change of form; from triangular with rounded angles they had become spherical. In the next stage a slight swelling was observed on many of them, and at a more advanced period there issued at this place several minute transparent filaments, never exceeding four in number from the same seed; one or more of these had usually made greater progress than the others. In their interior was seen a granular matter of a pale yellow colour. The observations were interrupted at a more advanced stage, when the filaments appeared to have become coherent at their bases. By careful examination under the microscope, it was found that each seed consists of two coats, the inner the most delicate of the two and containing a granular matter; the filaments appeared to be prolongations of it, and to have burst the outer and stronger membrane.

Figs. 5, 6, 7, 8 represent the germination at different periods. The receptacles containing the acrospermal conceptacles, generally when newly collected, have an orange-yellow colour, and after some hours an orange mucus exudes from the pores, which on examination with the microscope will be found to consist of acrosperms. The cell in which each of these bodies is included is for the most part so transparent, that it is difficult to detect the presence of any enclosing membrane, more especially if viewed in a drop of sea-water, the medium which ought always to be used in examining the structure of marine species. On placing them in fresh water the containing cell is seen to burst, and the enclosed acrosperms are expelled with considerable force. Each body is composed of a simple membrane containing small

granules which are usually regularly arranged. There is some difference in their form at different stages, as well as in the different species of *Fucus*. Figs. 9, 10, 11 represent those of *F. vesiculosus*; fig. 12 those of *F. nodosus*.

The presence of these bodies being so constant, it is not unreasonable to suppose that they perform some important function. Those who believe that impregnation is necessary in cellular plants, in the same sense at least as in the higher tribes, may probably consider that they are representatives of the anthers, and perform similar functions.

A few attempts were made for the purpose of ascertaining if they would germinate, by treating them in the same way as the *basisperms* of *F. canaliculatus* already mentioned. The experiments failed, and the difficulty seems to be to preserve the water at a proper and uniform temperature, for, owing to the delicacy of their structure, they are easily affected by changes. I believe, however, that they afford one means by which the Fuci are propagated, for the reason that the structure of the reproductive organs of *Alaria, Laminaria,* &c. is essentially that of *acrosperms*: this will be more particularly alluded to in a subsequent paper. The true species of *Fucus* may be considered as *heterospermous,* and it will be shown afterwards that other genera are *basispermous* and others *acrospermous*.

[To be continued.]

III.—*Descriptive Catalogue of the Zoophytes from the Crag.*

By S. V. Wood, Esq., F.G.S.

Mr. Richard Cowling Taylor, in a very valuable paper upon British "Antediluvian Zoology and Botany," communicated to the 'Magazine of Natural History' in 1830, was, I believe, the first to draw attention to the variety and interesting forms presented by the Corals of the Crag, and many very good figures are given by him in the above periodical, but unaccompanied by generic or specific characters.

In the following Catalogue I have endeavoured to furnish a list of these Polypifera, which are principally derived, as might be expected, from the deposit that has been termed *par excellence* "Coralline" Crag. This formation in the neighbourhood of Orford presents a close analogy to some of the coral reefs now forming, being composed almost entirely of corals, and sufficiently indurated to serve as a building-stone.

Among the corals of the crag we are presented with as great anomalies as among the Mollusca; recent species strictly British being associated with genera wholly unknown in a living state, as for example, *Fascicularia* and *Theonoa*. Although inferences re-